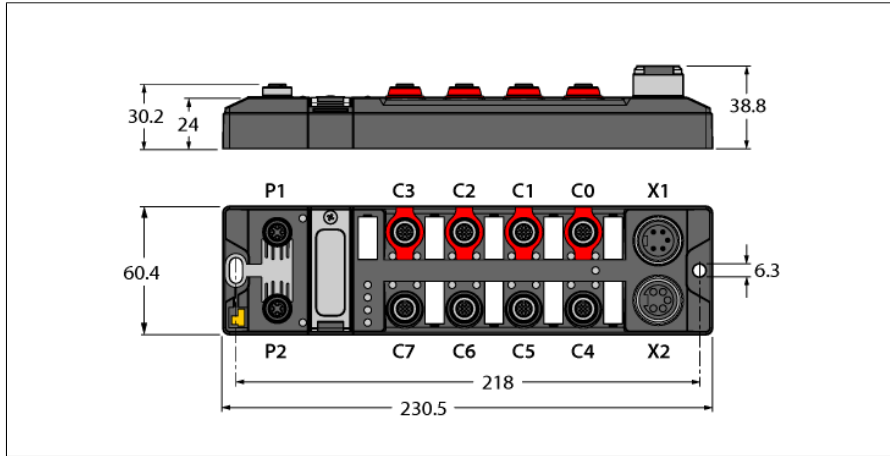


Hybrid Module for EtherNet/IP and CIP-Safety
Safe Digital Inputs and Outputs, Standard Universal Digital Channels, IO-Link
Master Ports
TBIP-L4-FDIO1-2IOL



- EtherNet/IP™
- Integrated Ethernet switch
- 10 Mbps / 100 Mbps supported
- 2 x male M12, 4-pin, D-coded, Ethernet-Fieldbus connection
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- 7/8" connector for power supply, 4-pin
- Two safe digital SIL3-inputs
- 2 IO-Link Master V1.1 slots

| | |
|-------------------------|--------------------|
| Type designation | TBIP-L4-FDIO1-2IOL |
| Ident-No. | 100000360 |

| | |
|---------------------------|--|
| Supply | |
| Supply voltage | 24 VDC |
| Admissible range | 20.4...28.8 VDC |
| Voltage supply connection | 4-pin male 7/8" connector X1 |
| Electrical isolation | galvanic isolation of the voltage groups V1 and V2, voltages up to 500 VAC |

| | |
|--------------------------------|-------------------------|
| System data | |
| Fieldbus transmission rate | 10 Mbps/100 Mbps |
| Fieldbus connection technology | 2 x M12, 4-pin, D-coded |
| Web server | integrated |
| Service interface | Ethernet via P1 or P2 |

| | |
|---------------------------|------------------------------------|
| EtherNet/IP™ | |
| Addressing | acc. to EtherNet/IP™ specification |
| Quick Connect (QC) | < 150 ms |
| Device Level Ring (DLR) | supported |
| Class 1 connections (CIP) | 3 |

| | |
|--------------------------------------|---------------------------|
| Safety Data | |
| PL acc. to DIN EN 13849-1:2008 | e |
| Category acc. to DIN EN 13849-1:2008 | 4 |
| SIL according IEC 61508 | 3 |
| Useful Lifetime | 20 Jahre (EN ISO 13849-1) |

| | |
|---|--|
| Safety Inputs OSSD | |
| Low level signal voltage | EN 61131-2 Type 1 (< 5 V; < 0.5 mA) |
| High level signal voltage | EN 61131-2 Type 1 (> 15 V; > 2 mA) |
| Max. OSSD supply per channel | 2 A per C0, C1, C2, C3, 1.5 A at 70 °C Please consider derating as shown in figure 1 |
| Max. tolerance test pulse width | 1 ms |
| Interval between 2 test pulses, minimum | 20 ms at 1 ms test pulse width 15 ms at 0.5 ms test pulse width |

| | |
|--|--|
| Safety Inputs floating/antivalent | |
| Max. loop resistance | < 150 Ω |
| Max. cable length | max. 1 μF at 150 Ω Limited by line capacity |
| Test pulse, typical | 0.6 ms |
| Test pulse, maximum | 0.8 ms |
| Sensor supply | Power supply V AUX1/T1 max. 2 A Please consider derating as shown in figure 1 |
| Interval between 2 test pulses, minimum | 900 ms |
| Additional information | No connection to external potential allowed |

Figure 1

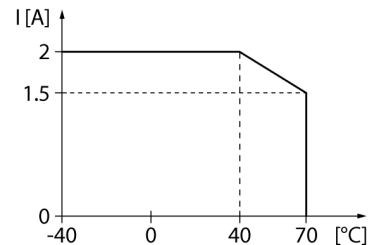
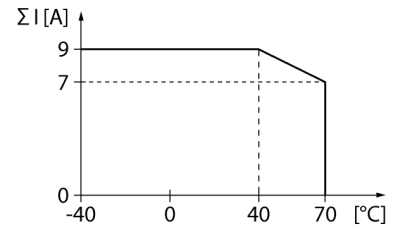


Figure 2



Hybrid Module for EtherNet/IP and CIP-Safety

Safe Digital Inputs and Outputs, Standard Universal Digital Channels, IO-Link Master Ports

TBIP-L4-FDIO1-2IOL

Safety Outputs

| | |
|---|--|
| Output current in off state | < 5 V |
| Output current in off state | < 1 mA |
| | suitable for inputs according to EN 61131-2 Type 1 |
| Test pulse, typical | 0.5 ms |
| Test pulse, maximum | 1.25 ms |
| Interval between 2 test pulses, typical | 500 ms |
| Interval between 2 test pulses, minimum | 250 ms |
| Actuator power supply | Power supply V AUX1/T1 max. 2 A Please consider derating as shown in figure 1 |
| Max. output current | 2 A (resistive) 1 A (inductive) |
| Additional information | The load must be mechanically or electrically inert to tolerate the test pulses. When configured as a PPM switching output the negative pole of the load should be wired to the M-terminal of the corresponding output (Pin 2). |

Digital inputs

| | |
|---------------------------|---|
| Connectivity inputs | M12, 5-pin |
| Input type | PNP |
| Switching threshold | EN 61131-2 Typ 3, PNP |
| Low level signal voltage | < 5 V |
| High level signal voltage | > 11 V |
| Low level signal current | < 1.5 mA |
| High level signal current | > 2 mA |
| Input delay | 2.5 ms |
| Sensor supply | C4, C5: FSO 0 max. 2 A; 500 mA per input C6: V AUX1 max. 2 A C7: FSO1 max. 2 A Please consider derating as shown in figure 1 |
| Electrical isolation | Galvanically isolated to the fieldbus Voltage proof up 500 VDC |

Connectivity outputs

| | |
|----------------------------|--|
| Connectivity outputs | M12, 5-pol |
| Output current per channel | 0.5 A, short-circuit proof, max. 2 A (resistive)/ 1 A (inductive) all std. outputs |
| Actuator power supply | C4, C5: FSO 0 max. 2 A; 500 mA per output C6: V AUX1 max. 2 A C7: FSO1 max. 2 A Please consider derating as shown in figure 1 |

IO-Link

| | |
|-----------------------|---|
| Number of channels | 2 |
| IO-Link specification | Version 1.1 |
| IO-Link port type | Class A and Class B |
| Frame type | supports all specified frame types |
| Supported devices | max. 32 byte input/32 byte output |
| Transmission rate | 4.8 kbps (COM 1) / 38.4 kbps (COM 2) / 230 kbps (COM 3) |
| Power supply | Power supply V AUX1 max. 2 A Please consider derating as shown in figure 1 |

Standard/Directive conformity

| | |
|-------------------------------|--|
| Vibration test | acceleration to 20 g acc. to EN 60068-2-6 |
| Shock test | acc. to EN 60068-2-27 |
| Drop and topple | acc. to EN 60068-2-31/IEC 60068-2-32 |
| Electromagnetic compatibility | acc. to EN 61131-2 |
| Approvals and certificates | CE, FCC, UV-resistant in accordance with DIN EN ISO 4892-2A (2013) |
| UL Certificate | cULus LISTED 21 W2, Encl.Type 1 IND.CONT.EQ. |

Hybrid Module for EtherNet/IP and CIP-Safety

Safe Digital Inputs and Outputs, Standard Universal Digital Channels, IO-Link Master Ports

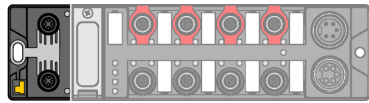
TBIP-L4-FDIO1-2IOL

General Information

| | |
|------------------------|---------------------------|
| Dimensions (W x L x H) | 60.4 x 230.4 x 39mm |
| Operating temperature | -40...+70 °C |
| Storage temperature | -40 °C ... +85 °C |
| Altitude | max. 5000 m |
| Protection class | IP65 IP67 IP69K |
| Housing material | PA6-GF30 |
| Housing color | Black |
| Window material | Lexan |
| Material screw | 303 stainless steel |
| Material label | Polycarbonate |
| Halogen-free | yes |
| Mounting | 2 mounting holes □ 6.3 mm |

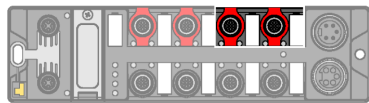
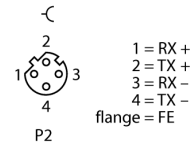
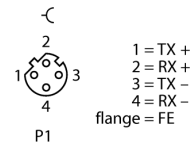
The data sheet serves as advance information. For definitive values see the corresponding product manual. In this respect, no liability for completeness and accuracy can be applied to the content of this data sheet.

Hybrid Module for EtherNet/IP and CIP-Safety
Safe Digital Inputs and Outputs, Standard Universal Digital Channels, IO-Link
Master Ports
TBIP-L4-FDIO1-2IOL



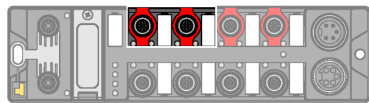
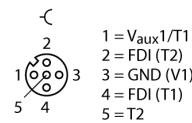
Accessories
Ethernet cable (example):
RSSD RSSD 441-2M
Ident. no. U-02482

M12 × 1 Ethernet



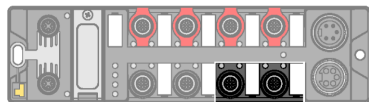
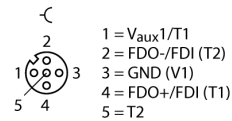
Accessories
Actuator and sensor cable/PUR connection cable (example):
RKC4.5T-2-RSC4.5T/TXY
Ident. no. 6629805

M12 × 1 Safety Inputs



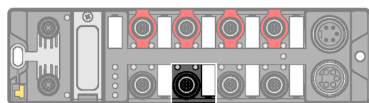
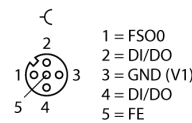
Accessories
Actuator and sensor cable/PUR connection cable (example):
RKC4.5T-2-RSC4.5T/TXY
Ident. no. 6629805

M12 × 1 Safety I/O Port



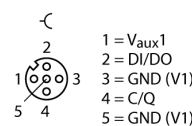
Accessories
Actuator and sensor cable/PUR connection cable (example):
RKC4.5T-2-RSC4.5T/TXL
Ident. no. 6625612

M12 × 1 I/O Port

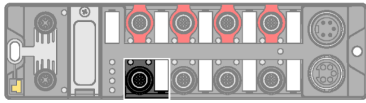


Accessories
Actuator and sensor cable/PUR connection cable (example):
Connection of a class A device:
RKC4T-2-RSC4T/TXL
Ident. no. 6625604
Connection of a class B device:
RKC4.5T-2-RSC4.5T/TXL
Ident. no. 6625612

M12 × 1 IO-Link



Hybrid Module for EtherNet/IP and CIP-Safety
Safe Digital Inputs and Outputs, Standard Universal Digital Channels, IO-Link
Master Ports
TBIP-L4-FDIO1-2IOL



Accessories

Actuator and sensor cable/PUR connection cable (example):

Connection of a class A device:

RKC4T-2-RSC4T/TXL

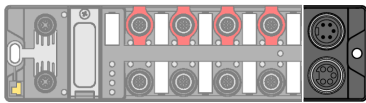
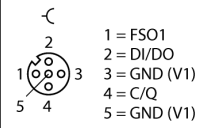
Ident. no. 6625604

Connection of a class B device:

RKC4.5T-2-RSC4.5T/TXL

Ident. no. 6625612

M12 × 1 IO-Link



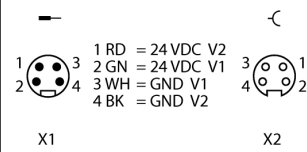
Accessories

Power supply cable (example):

RSM RKM 40-2M

Ident. no. U2280-0

7/8" Power Supply



Hybrid Module for EtherNet/IP and CIP-Safety

Safe Digital Inputs and Outputs, Standard Universal Digital Channels, IO-Link Master Ports

TBIP-L4-FDIO1-2IOL

Module Status LED

| LED | Color | Status | Description |
|-----------|-------------|-----------------------------------|---|
| ETH1/ETH2 | Green | ON | Ethernet Link (100 Mbps) |
| | | flashing | Ethernet communication (100 Mbps) |
| | | OFF | No Ethernet link |
| NS | Green | On | Active connection to a master |
| | | flashing | Connection has been established but not fully completed |
| | Red | On | Communication Error |
| | | flashing | One or more I/O connections have the time-out status. |
| Red/Green | Alternating | Faulty self-test or configuration | |
| MS | Green | On | Diagnostics disabled |
| | Green | Flashing | When used as a stand-alone device: Device is in protective mode, an EtherNet/IP™ client is accessing the standard I/Os. |
| | Red | On | Critical error |
| | Red | Flashing | Correctable error |
| | Green/Red | Flashing alternately | Faulty self-test or configuration |
| PWR | Green | ON | Power supply V, OK |
| | | OFF | V, power off or below defined tolerance of 18 V |

LED Status I/O

| LED | Color | Status | Description |
|--|-------------|--|---|
| 0...3 | Green | ON | Channel active |
| | | flashing | Self test |
| | Red | ON | Discrepancy |
| | | flashing | Cross circuit |
| 4...7 | Green | ON | Channel active |
| | | flashing | Self test (input only) |
| | Red | ON | Discrepancy, overload (output only) |
| | | flashing | Cross circuit |
| 8...11 | Green | ON | Channel active |
| | Red | ON | Overload (output only) |
| | | flashing | Overload of supply |
| Green/Red | alternating | Channel active and overload of supply (input only) | |
| 12, 14 (IO-Link Port 1 and 2) IO-Link Mode | Green | flashing | IO-Link communication, process data valid |
| | | Red | flashing |
| | Red | ON | IO-Link supply OK, no IO-Link Communication |
| | | OFF | Port inactive |
| 12, 14 (IO-Link Port 1 and 2) SIO Mode | Green | ON | Digital Input signal is present |
| | | OFF | No input signal |
| 13, 15 | Green | ON | Digital input or output active |
| | | Red | ON |
| | Red | flashing | Overload of supply |
| | | OFF | Input or output inactive |

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Process Data Mapping of the Single Protocols

For more details on the corresponding protocols see manual.